

Remarks

Independent claims 1 and 10 have been amended to more clearly recite the invention. These claims now state that adhesive expulsion holes in the first portion of the rivet tubular body extend along its length. Claim 10 also requires holes around the circumference of the tubular body. As described in paragraph 0021 of the specification and illustrated in Figures 1 and 2, holes 62 for the expulsion of adhesive are provided along the length and around the circumference of the first body portion 42. Original claim 14 also recites this feature of the invention. Adhesive holes, thus located, permits extrusion of adhesive between the material surfaces to be joined and between the length of the rivet and the rivet body-contacting surfaces of the material layers when the rivet is set (see, e.g., paragraph 0024).

Claims 1-6, 8-10, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newton (U.S. 3,772,957) in view of Lacy et al (U.S. 4,958,971). Claims 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newton (U.S. 3,772,957) in view of Lacy et al (U.S. 4,958,971) as applied to claims 1, 3, and 11(sic), claim 10?, and further in view of Eklund (U.S. 2,324,142). The Examiner is respectfully requested to reconsider each of these rejections for the following reasons.

Before discussing these applied references, it may be useful to summarize features of Applicants' independent claims 1, 10, and 14. These claims recite structural elements of rivets for insertion through a rivet hole to join two or more material layers when one side of the layers is inaccessible for setting the rivet. The claim elements include a rivet head with an attached tubular rivet body. But the claimed rivets provide for both mechanical securing of the material layers against opposite faces, and an adhesive bond between the rivet body and material layers along the length of the rivet body contacting the layers. The length of the tubular rivet body is adapted for the thickness of the material layers to be attached by the rivet. The tubular rivet body has a first length portion that extends from the rivet head through the layers to be attached. This first portion of the rivet body contains adhesive and holes along the first portion length for expulsion of adhesive from the first length portion into contact with the layers to be joined. In accordance with claim 10, the holes also extend around the circumference of the tubular rivet body.

The rivet also includes a second body portion that extends beyond the blind side of the layer assembly when the rivet is inserted. This second body portion contains a substantial amount of adhesive. It also has weakened regions that can be deformed into a blind side rivet head when the rivet is set. But the weakened regions must also function to push adhesive from the second body portion into the first body portion, and to push adhesive from the first body portion out of the rivet body. The first portion of the rivet body has holes for expulsion of adhesive, but first body portion does not have weakened regions that function like the weakened regions of the second body portion. The combination of Newton '957 with Lacey et al '971, and further with Eklund '142, do not teach or suggest a rivet with such a group of adhesive bonding capabilities.

Newton's self drilling rivet provides adhesive apertures 28 (Figures 4-7 or 50 (Figures 8 and 9) at a single axial location on the rivet barrel. Newton intends to only extrude sealant at the interface between structure layers S. Newton does not provide adhesive holes along the axis of rivet barrel 18. Any extrusion of adhesive in Newton's rivet relies on displacement by drill head 16 when the rivet is set.

In marked contrast with Newton's disclosure, Applicants' provide adhesive in their second tubular body portion (at least one-quarter of the total, as recited in claims 4-6). And Applicants provide for an accordion-like collapse of the second tubular wall portion so as to extrude a substantial amount of adhesive into the adjacent first tubular rivet body portion. The patterned weakening of the regions of the second rivet body portion is for effective extrusion of adhesive out of the axially spaced holes in the first body portion. The stated goal of Applicants' claim combinations is to provide such an extensive deposit of adhesive outside the rivet body while the rivet is being set and the second rivet head formed. Newton does not suggest such a concept.

The Examiner turns to the Lacey et al patent as showing weakened circumferential grooves 27, 28, 29 in the deformable shell 11 of his break-stem blind rivet. Lacey et al state (col. 2, lines 65-66) that bands 27, 28, 29 are illustrated in their intended arranged order from the tail end 15 of the shell toward the head 16 of the rivet. The spacing between the grooves, as illustrated in Figure 1 and described in col. 3, actually increases in the direction from the rivet head 16 to the deformable tail end 15 of the shell. Lacey et al want a "one size fits all rivet." They form grooves along the full length of their rivet so that it will form a second rivet head

despite varying workpiece thicknesses. This means that the grooves are not grouped in the tail-end of their shell 11 for extrusion of an adhesive. This is not surprising because Lacey et al do not contemplate the use of an adhesive. Applicants' attorney cannot find the word "adhesive" in the Lacey et al disclosure. The illustration in Lacey's Figure 2 shows no place for an adhesive body, nor any thought of using such an adhesive.

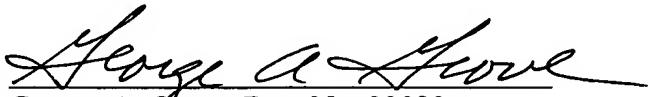
Thus, Lacey et al teach away from the rivet structure claimed by applicants. They do not contemplate the application of an adhesive in the riveted joint. They do not locate weakened grooves in a second portion of a rivet body to expel adhesive from a first body portion. And they do not provide a first rivet body portion with adhesive expulsion holes but with no other weakened grooves or regions.

There is no proper or logical basis to combine the teachings of Newton and Lacey et al. Newton doesn't suggest the need for additional or different means to move his adhesive, and Lacey et al don't see any need for an adhesive. But if the Lacey et al teaching is applied in the Newton disclosure, one skilled in the art would be led to locate the Lacey deformable bands toward the rivet head. Such a location is unfavorable for extrusion of an adhesive. And such a strategy for locating grooves does not suggest the use of an adhesive. The combination of Newton with Lacey et al isn't suggested by their teachings, and it doesn't work to suggest a rivet as recited in claims 1-6, 8-10 and 12-14. It is respectfully requested that this rejection be reconsidered and removed.

The Eklund patent is combined with Newton and Lacey et al in rejection of dependent claims 7 and 11. Eklund is said to disclose a tubular rivet body with corrugations 17 and 19. But Eklund (like Lacey et al) forms cut grooves 23 and rolled grooves 17 and 19 along the whole length of tubular member 12, including portions that lie within plates 10 to be riveted. Eklund doesn't describe any of his grooves as corrugations, and it isn't clear that they have such regular spacing to function like corrugations as illustrated in Applicants' Figure 1. But the point is that Eklund doesn't contemplate the use of an adhesive. And he doesn't provide holes in his tubular rivet body in a first portion for expulsion of an adhesive, nor does he pointedly locate weakened regions, outside the pieces to be joined, for both expulsion of an adhesive and setting of the second rivet head. Accordingly, it is respectfully requested that the rejection of claims 7 and 11 be reconsidered and withdrawn.

It is submitted that the combination of rivet elements recited in claims 1-14 is not disclosed or suggested in any combination of Newton, Lacey et al, or Eklund. It is respectfully requested that these claims be allowed and the case passed to issue.

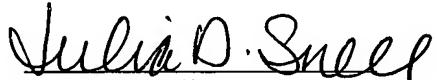
Respectfully Submitted,



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